R. F. STEWART.

MECHANICAL STOKER.

APPLICATION FILED JUNE 23, 1909. RENEWED SEPT. 27, 1911.

1,014,534.

Patented Jan. 9, 1912.

3 SHEETS—SHEET 1.

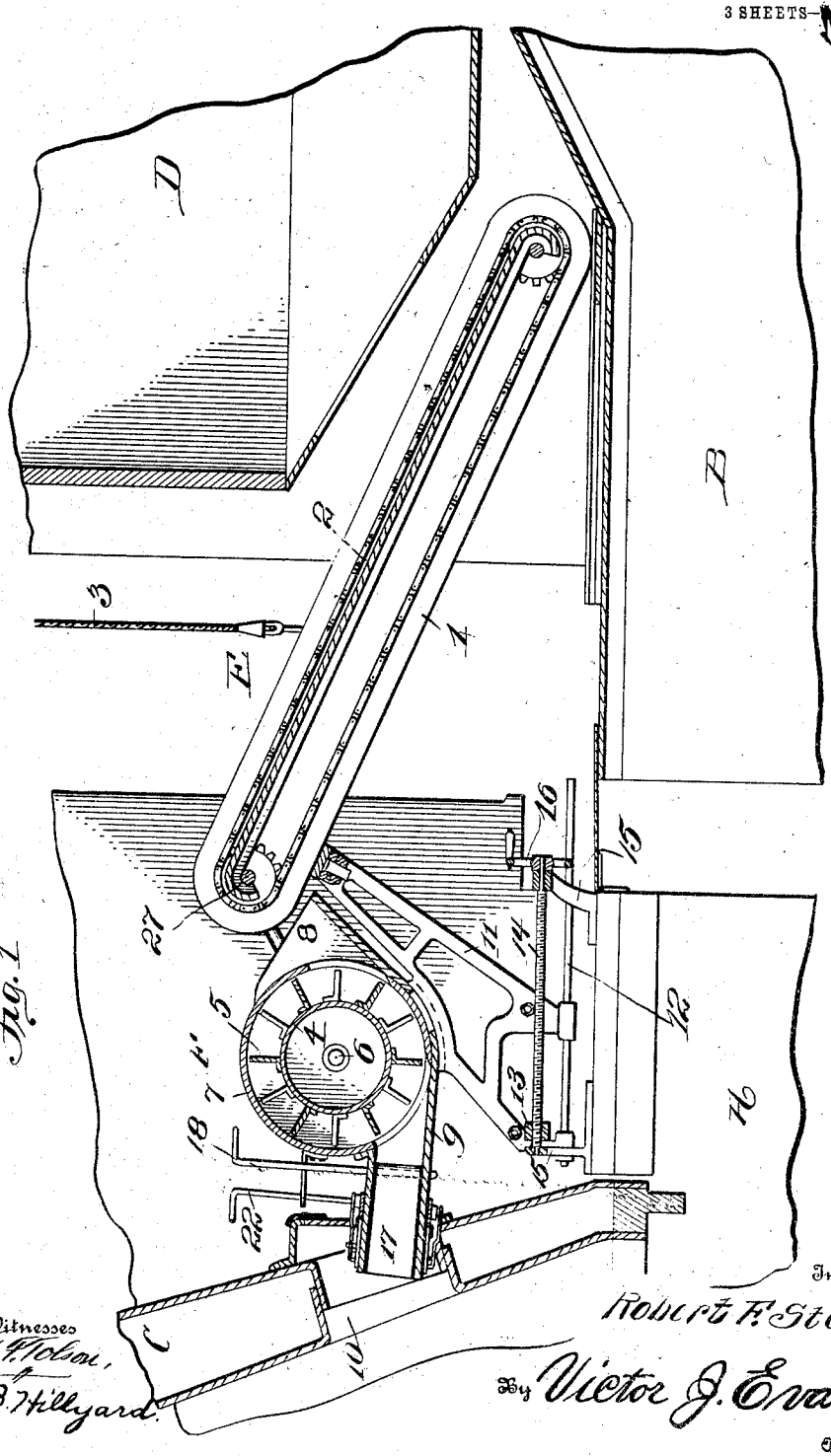

Fig. 1.

Witnesses
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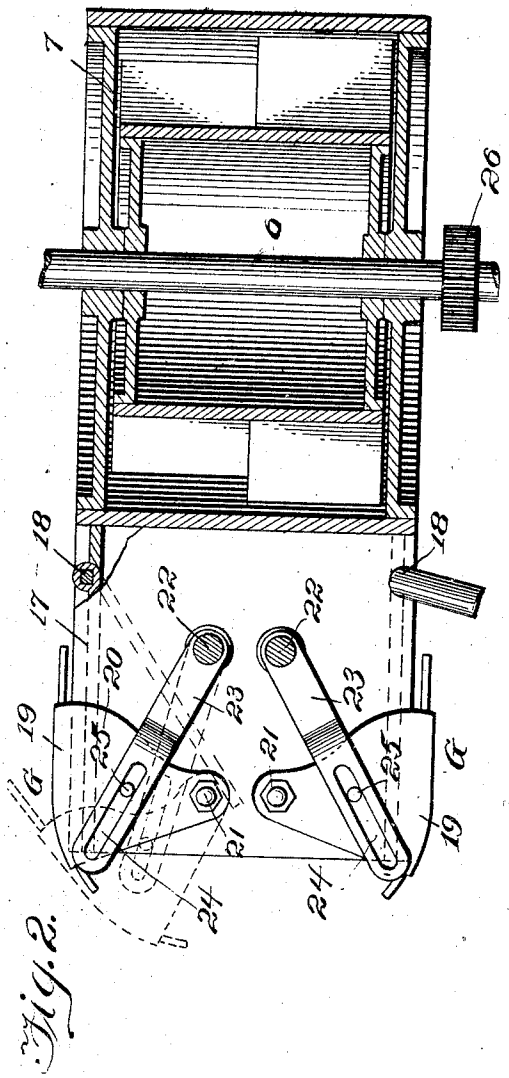

Fig. 2.

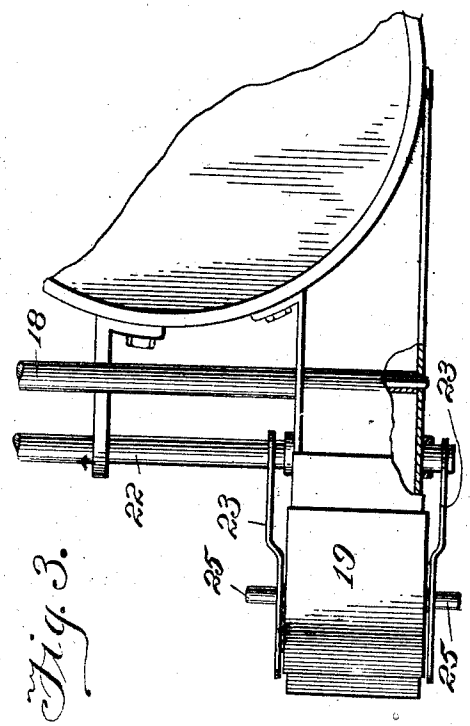

Fig. 3.

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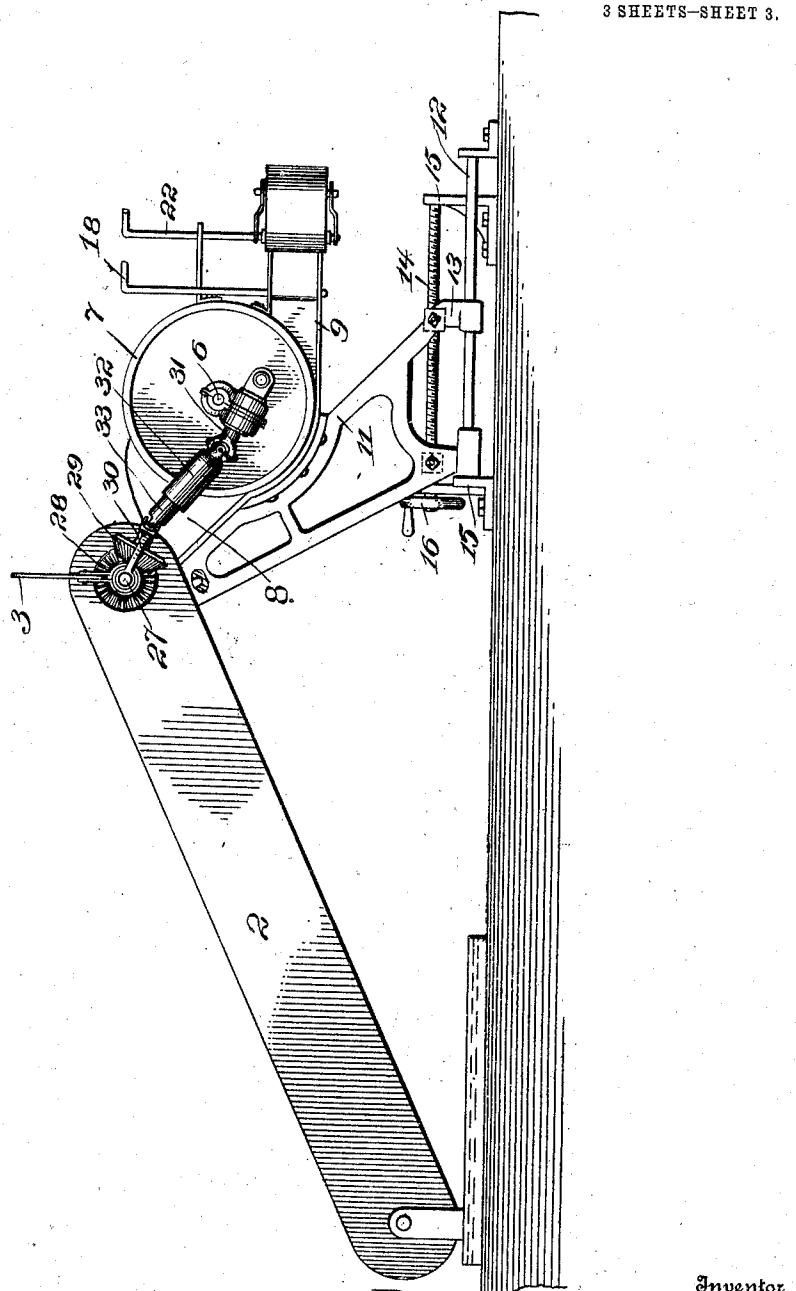

Fig. 4.

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UNITED STATES PATENT OFFICE.

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MECHANICAL STOKER.

1,014,534. Specification of Letters Patent. Patented Jan. 9, 1912.

Application filed June 23, 1909, Serial No. 503,891. Renewed September 27, 1911. Serial No. 651,616.

To all whom it may concern:

Be it known that I, ROBERT F. STEWART, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented new and useful Improvements in Mechanical Stokers, of which the following is a specification.

The purpose of this invention is to devise mechanical means of unique and peculiar structure for automatically supplying fuel to the furnaces of locomotive and other types of steam boiler furnaces, the arrangement being such as to enable the fuel to be directed to any point in the fire box, the force for feeding the fuel being variable according to the distance of delivery.

The mechanism embodies a rotary feeder, means for supplying fuel to the rotary feeder and consisting of an endless conveyer, a chute leading from the casing of the rotary feeder, wings at opposite sides of the chute and adjustable to any required angle to direct the fuel to one side or the other of the fire box, hoods coöperating with the chute and wings to likewise materially assist in giving proper direction to the fuel, and means for moving the rotary feeder into or out of operative position.

For a full understanding of the invention, reference is to be had to the accompanying drawings and to the following description, in which corresponding and like parts are referred to in the description and indicated in all the views of the drawings by the same reference characters.

In the drawings forming a part of the specifications Figure 1 is a vertical central longitudinal section of a mechanical stoker embodying the invention showing the same in operative position. Fig. 2 is a horizontal section of the rotary feeder, showing the chute and the wings and hoods coöperating therewith in full lines. Fig. 3 is a side view of the parts illustrated in Fig. 2, portions being broken away. Fig. 4 is a side view of the stoker showing the endless conveyer, the means for transmitting power from the rotary feeder to the endless conveyer, and the means for moving the rotary feeder into and out of operative position.

The reference letter A designates part of a locomotive engine and B, part of a tender.

The front of the furnace is represented at C and the fuel bin or compartment at D.

The conveyer is indicated at E and is mounted upon the tender B and is shown as consisting of a framework 1 and an endless apron or belt 2 supported at its ends upon rollers or sprocket wheels at opposite ends of the framework 1. The conveyer E is of the endless type and is adapted to be raised and lowered. For this purpose, a cable 3 is shown, the same being connected to a windlass or drum, not shown, and passing over a suitable guide pulley so as to effect the desired result. The lower end of the endless conveyer extends below a part of the fuel bin or compartment D so as to automatically receive the fuel therefrom and deliver the same to the rotary feeder.

The rotary feeder F comprises a drum 4 and a series of blades 5 arranged about the drum in staggered relation and projecting radially therefrom. The drum 4 is mounted upon a shaft 6 in such a manner as to rotate therewith and is inclosed within a casing 7. A hopper 8 is provided at the rear of the casing 7 and is arranged below the upper end of the endless conveyer E so as to receive the fuel therefrom and direct the same to the rotary feeder. A chute 9 extends forwardly from the lower portion of the casing 7 in an approximate horizontal direction and is adapted to enter the opening 10 in the front of the furnace. The rotary feeder and adjunctive parts are mounted upon a frame 11 which is mounted to receive a sliding movement toward and from the furnace. Horizontally disposed guide rods 12 support the frame 11 and the latter is provided with a cross bar 13 in which a threaded opening is formed to receive a feed screw 14 mounted at its ends in bearings 15. A hand wheel 16 fast to the outer or rear end of the feed screw 14 provides convenient means for turning the feed screw when it is required to move the frame 11 on the rotary feeder mounted thereon. Wings 17 are provided at opposite sides of the chute 9 and are pivotally mounted so as to be moved laterally at their free ends to direct the fuel to either side of the fire box or to an intermediate point thereof. Vertically arranged rods 18 are mounted at opposite sides of the chute and receive the rear ends of the wings 17, the connection being such as to cause the wings to move with the rods 18 when the latter are turned. As indicated the upper ends of the rods 18 are bent to provide handles for convenience of operation when it is required to move the

wings 17 to give proper direction to the fuel. Hoods G are likewise provided at opposite sides of the chute and are pivotally mounted and are adapted to supplement the action of the wings 17 in giving proper direction to the fuel. Each hood consists of an outer member 19 and upper and lower members 20, the latter embracing upper and lower sides of the chute and pivotally connected thereto at 21 by bolts or other fastening means. The outer or forward ends of the members 19 are inwardly curved so as to come together and vary the effective size of the delivery opening thereby in a measure regulating the quantity of fuel fed to the furnace in a given time. Vertically disposed rods 22 suitably mounted are provided near their lower ends with arms 23. Each arm has a longitudinal slot 24 into which projects a stud 25 of the adjacent or upper member 20 of the hood. The upper ends of the rods 22 are bent to provide operating handles. Upon turning the rods 22, the hoods are swung upon their pivot supports 21 sc as to cover the delivery end of the chute to a greater or less extent.

The rotary feeder F and the supporting frame 11 are mounted upon the locomotive engine A whereas, the conveyer E is mounted upon the tender B. The forward end of the framework 1 of the conveyer E rests upon an extension of the frame 11, the connection being such as to allow for the swaying and up and down movements of the locomotive engine and tender. The rotary feeder is adapted to be driven by means of a donkey engine mounted upon the locomotive engine or by means of any other source of power, the same being applied to the shaft 6 by means of gearing 26 or other power transmission. The endless conveyer receives power from the rotary feeder and is connected with the shaft 6 thereof. In order to compensate for the relative movements between the rotary feeder and endless conveyer, the power transmission between them must be self-adjusting. The upper forward shaft 27 of the roller or sprocket wheels supporting the endless apron 2 is extended at one end and provided with a gear wheel 28, which is in mesh with a gear wheel 29, fast to a shaft 30. A shaft 31 is geared in any suitable way to the shaft 6 so as to receive power therefrom. A shaft section 32 is connected by a universal joint to the shaft 31. A shaft section 33 is connected by a universal joint to the shaft 30 and telescopes with the shaft section 32. The connecting means disclosed herein between the two shafts 6 and 27 admit of the rotary feeder and endless conveyer having relative play with the respective parts A and B.

When the invention is in operative position, it occupies the position about as shown in Fig. 1, that is, with the end of the chute 9 extended into the door opening 10 of the furnace C. The fuel is automatically supplied to the lower end of the conveyer E and is delivered thereby to the rotary feeder which, is driven at such relative speed as to throw the fuel through the chute 9 with such force as to insure its delivery either, at the rear, the front, or at any intermediate point of the fire box. By proper adjustment of the wings 17, the fuel may be directed either to the right or to the left of the fire box or to the center thereof. Manipulation of the hoods in the manner stated, may supplement the action of the wings 17 in properly directing the fuel or of controlling the amount fed to the fire box in a given time. When it is required to gain access to the furnace, the feed screw 14 is operated to move the frame 11 rearward thereby carrying the rotary feeder clear of the furnace as will be readily understood. When the fuel is to be delivered centrally of the fire box, the wings 17 are moved so as to occupy a central position with reference to the chute 9. If the fuel is to be supplied to the right hand portion of the fire box, one or both wings 17 are correspondingly inclined to the right. To direct the fuel to the left hand portion of the fire box the wings 17 are inclined toward the left. When the rotary feeder is operated at a comparatively high speed, the fuel is thrown through the chute 9 with such force as to reach the back portion of the fire box. By diminishing the speed of the rotary feeder, the fuel may be supplied either to the front or to any part of the fire box between the front and the back. It will thus be understood that by properly regulating the speed of the rotary feeder and adjusting the wings 17, the fuel may be directed to any part of the fire box.

Having thus described the invention, what is claimed, is:

1. A mechanical stoker comprising a feeder having a delivery chute, means arranged within the chute for directing the fuel to the desired place in the furnace, a framework supporting said feeder, means for moving the framework toward and from the furnace to advance the feeder or to move the same out of the way, a conveyer for supplying fuel to the feeder, and means for moving the conveyer so as to be out of the way when access to the parts is required.

2. A mechanical stoker comprising a casing having a delivery chute and a receiving hopper, a rotary feeder arranged within the casing between the chute and hopper, means located in the chute for giving proper direction to the fuel in its discharge, a supporting framework for the casing, means for positively adjusting the framework toward and from the furnace, a conveyer movably mounted upon said framework, and power

transmitting means between the feeder and conveyer whereby both are caused to operate simultaneously at any stage of adjustment of the parts.

3. In a mechanical stoker the combination of a feeder, means for supplying fuel to the feeder and relatively adjustable with reference thereto, a framework supporting the feeder and adjacent end of the fuel supplying means, guides for supporting the framework and directing the same in its movements, and a feed screw mounted in fixed bearings and having screwthread connection with said framework to move the same backward or forward.

4. In a mechanical stoker the combination of a casing having a chute, a rotary feeder mounted within the casing and adapted to deliver the fuel at a comparatively rapid speed through the chute to throw the fuel into the innermost portion of the fire box, wings arranged within the chute to direct the fuel to the right or to the left, hoods comprising upper and lower members arranged above and below the chute and outer members exterior to the chute and connecting the outer edges of said upper and lower members, the forward portions of the outer members of the hoods curving inwardly, said hoods being pivotally connected to the chute, vertically disposed rods, and slotted arms extended from said rods and having connection with the hoods to turn the same about their pivotal connections with the chute.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT F. STEWART.

Witnesses:
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CHARLIE M. HARE.